

CARBON ES REPORT

ES expert

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Harmonized methodology



Inputs
 Scenario
 Standing, Harvey volume
 Increment
 Mortality
 Year
 Assortment
 Harvest residue

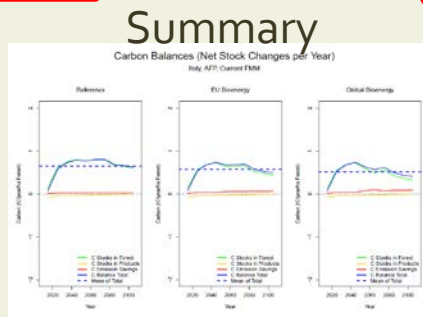
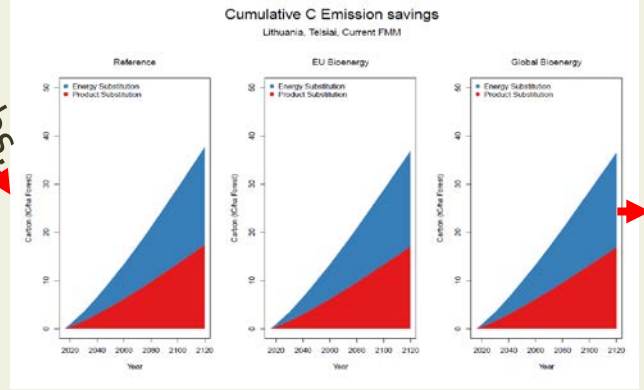
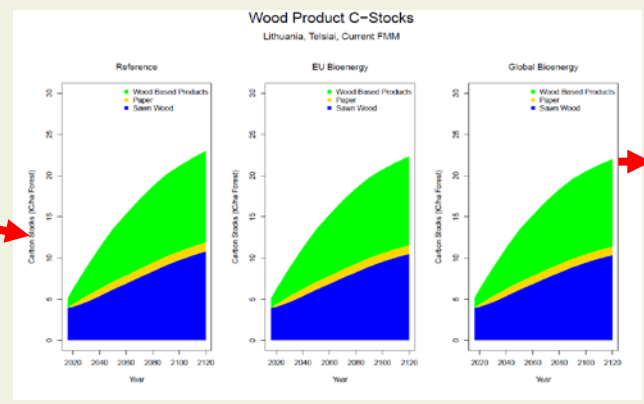
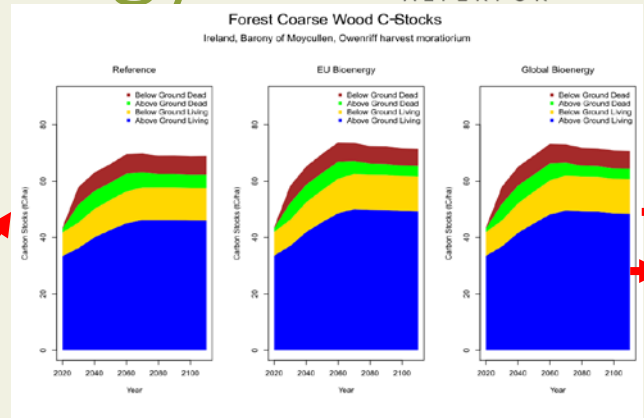
Parameters
 Biomass, Exp F, dens.
 Root ratio
 Deadwood, turnover, inputs
 half life,
 fragmentation
HWP allocations
 Assortment to energy or
 HWP (scenario dependent)
 Increment

C script in R

Forest

HWP

Prod. & energy subs.

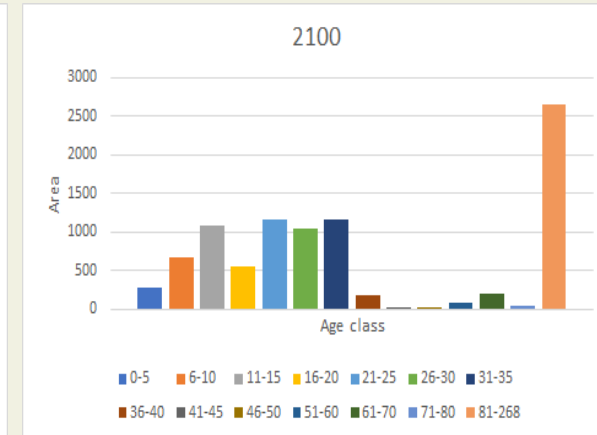
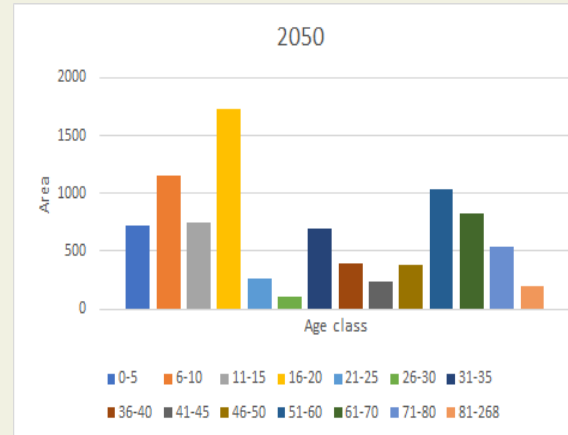
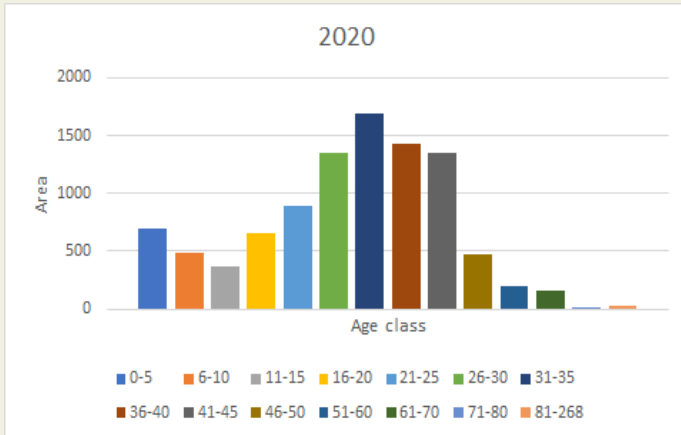


Methodological issues?



- Organic soils, apply drainage EF ca. 1 t C/ha/yr (Ireland, Lithuania?, Sweden?)
- Some CSAs used default parameters for HWP-energy substitution
- Fires, can we apply GHG emissions based on probability of fires events (area)?
- Some CSAs have no climate impact of C seq.

Age class shift



Left (younger forest)

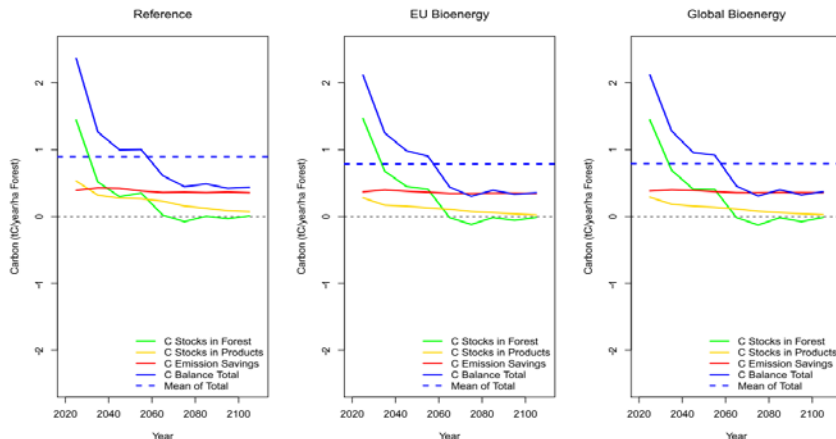
- Decline in productivity
- Decreased sink



Right (as forests mature)

- Increase up to max incr.
- Increased sink up to max then decline

Carbon Balances (Net Stock Changes per Year)
Ireland, Barony of Moycullen, Owenriff harvest moratorium



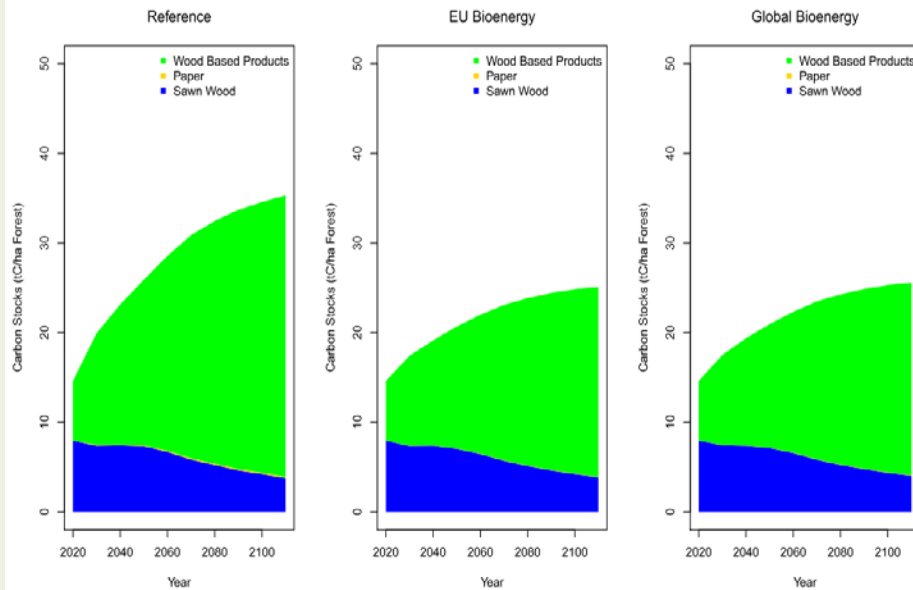
Age class legacy is the main consideration in new EU LULUCF regulation (FRL)

Allocation between HWP and energy

- Higher sawlog output and allocation to HWP or product substitution results in higher C sink
- Pulpwood to energy or paper results in a lower sink

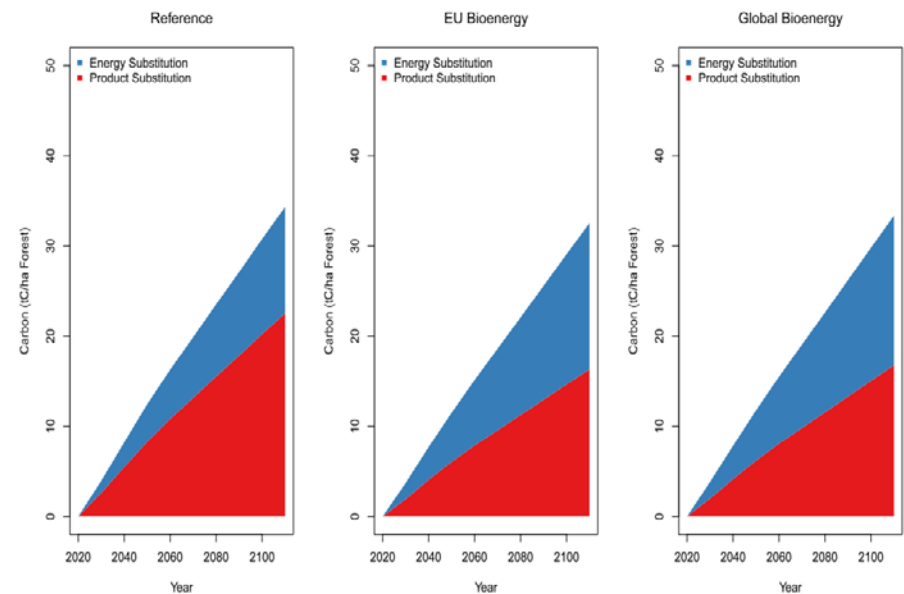
Wood Product C-Stocks

Ireland, Barony of Moycullen, Owenriff harvest moratorium



Cumulative C Emission savings

Ireland, Barony of Moycullen, Owenriff harvest moratorium



Drivers and trends

FOREST

- High correlation between forest sink and productivity and level of harvest
- Productivity driven by numerous factors, age class shift, climate change (positive and negative)- higher impact under different global frame scenarios
- Reference scenario generally had the smallest climate change impact

HWP and energy or product substitution

- Drivers are level of harvest, assortment output, allocation to end product
- Generally higher C seq. potential under Reference (low energy allocation)
- Incentive to higher allocation to long term product or product substitution

Overall

- Total C seq potential for CSAs highest under:
 - Reference scenario (4 out of 9 CSAs),
 - EU Bioenergy and Global Bioenergy (1/9 CSA)
 - Very small difference between scenarios (3/9 CSAs)

Conclusion

- Harmonised approach allowed good comparison across CSAs (thank you Peter)
- Always room for improvement: e.g. Should include emissions for organic soils and fires
- Drivers of C seq under different scenarios generally well characterised
- Findings such as age class shift effects (Böttcher et al., 2008) and allocation or displacement of harvest towards energy production (Stare and O Connor, 2010; Smyth et al., 2016) consistent with literature
- High relevance to the EU policy and Paris agreement (COP21)
 - EU LULUCF regulation (FRL) 2018
 - EU forest strategy 2013
 - EU energy directive 2012